CLINIC ON NERVOUS DISEASES.

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LEAD PARALYSIS.

GENTLEMEN:—The demonstration of a thing is worth all the descriptions in the world. You will remember that at our last two or three clinics we were talking about the reaction of degeneration, and you will further remember what we considered that reaction to be. I have here a man regarding whose condition I will say but little, as his complaint is one with which you are familiar, but I will proceed at once to demonstrate it. The patient is about thirty years of age, and states that he has had his present trouble about seven weeks; that it began with weakness in the shoulder; that he was unable to lift his arm, or to straighten his fingers. He says he has had no pain, no numbness, no tingling in the affected parts; he complains only of motor weakness. He also tells us that his condition is better than it was seven weeks ago. His occupation is that of carriage-painter. He had colic preceding the paralysis. His bowels are now free.

Gentlemen:—This man, as you hear, gives a straightforward history. He is a painter, works in varnish, and is engaged indoors. You know that painters who work within buildings, and especially those who work in close rooms, are more liable to develop lead poisoning than others. When you look at this man I think you will see at once that he has the appearance of being well-nourished, but is anæmic and pale. He has no apparent atrophy in any of the muscles, but if we ask him to go through certain movements, you will see he has deficiencies. When told to lift the right arm to the head, he is unable to do so. There is inability to abduct the arm. On the left side he succeeds in abducting the arm to a certain extent, but it is limited. When we look at him from behind and ask him to lift the arms, we see the degree of abduction made by the right arm is due to rotation of the scapula by the serratus magnus muscle. We know that complete abduction of the arm involves a complex process. It is performed partly by rotation of the scapula by means of the serratus magnus, and partly by the action of the deltoid. This man's scapula rotates normally, therefore the trouble with abduction is due to disturbance in the deltoid muscle. Now, besides the trouble in his shoulder he complains also of trouble in his arms. When I hold up his arm you will plainly see the condition known as drop-wrist. This is not as marked on the left as on the right side in this case. You will also notice very marked tremor when he attempts to hold the arms out by his own efforts. You will remember that at a previous clinic, when I spoke to you about tremor, I said it was a symptom of lead poisoning.

When I place my hand in his and ask him to grasp it, he does so with great feebleness; but when I correct the paralysis of the extensor muscles, he squeezes my hand so tightly as to cause pain. You see, therefore, although flexion is apparently impaired, it is not actually impaired in this case. The condition of paralysis is less marked on the left side than it is on the right.

No examination of a case of paralysis is complete until the electrical reaction has been tested. We will now proceed to test the electrical reaction with the Faradic current. We find that a moderately strong current causes the biceps to contract. The same strength of current applied over the deltoid produces no effect, and when I carry the strength of the current up to quite a high degree there is still no contraction. On the left side, on the contrary, there is a slight movement in the deltoid produced by the strong Faradic current.

We will now try the galvanic current, using this small portable chloride of silver battery. The normal reaction to galvanism is easily elicited. This we prove by first applying the negative pole over the patient's biceps, in which it causes at once perceptible contraction when the circuit is closed. That then gives us the cathodal closure contraction. Now we will apply the positive pole. The anodal closure contraction in the biceps muscle is less than the cathodal closure contraction. This man's biceps is not paralyzed, and we have in it the normal reaction to the electrical currents. Now we will try the deltoid which is paralyzed. Cathodal closure, as you see, gives but very slight contraction. Anodal closure gives very much greater contraction. Thus we find that the anodal closure contraction in the deltoid is greater than the cathodal closure contraction, which, as I have told you before, constitutes a reaction of degeneration. On the left side the difference between the cathodal and the anodal closure contraction is scarcely perceptible. It is difficult to say whether the one is greater than the other; at any rate the reaction cannot be normal because the cathode should produce distinctly greater contraction than the anode. We have then on the left side a condition known as partial reaction of degeneration, while in the right deltoid we have the condition known as total reaction of degeneration. This you see is the result of the electrical examination. It demonstrates at once that the condition in the deltoids is entirely different from that in the biceps.

You well know that the reaction of degeneration is due to disturbance either in the gray anterior horns of the spinal cord, or in the nerve outward from the cord to the muscle. In this case, which is distinctly one of lead palsy, we know that the lesion lies in the nerves and not in the cord. From the electrical reaction of the muscles we could not tell whether the lesion lay in the spinal cord or in the nerve; we could only tell by such a test that it did not lie in the brain or in the motor tract from the brain to the anterior gray horn of the cord. Through the demonstrations of pathology we have learned that the lesion in lead palsy is a neuritis; a neuritis which is limited to certain nerves going to the extensors of the arm and to the deltoid.

Now, what is the prognosis? The man has stopped his work, he has been ill only seven weeks, he has improved rapidly; therefore I think we may safely say that he will be completely well within three months of the time when his symptoms first manifested themselves. It is a light case of lead poisoning. Severe cases sometimes last longer. I have known them to be under treatment two years and then recover.

What is the treatment? The indications are first to eliminate the lead from the system so far as possible. That can be done by means of cathartics, especially by epsom salts, and by diuretics, especially iodide of potassium. Iodide of potash hastens the elimination of the lead through the kidneys. The second indication in treatment is to increase, if possible, the nutrition of the nerves which are degenerated. That can be accomplished by tonic treatment in general, especially by the use of strychnine in doses of one-sixtieth to one-forty-eighth of a grain, administered three times a day, or of fifteen to twenty minims of the tincture of nux vomica. The patient is taking nux vomica. The third indication is to hasten regeneration of the affected nerves by means of electricity. This is applied in the form of a constant galvanic current of moderate strength passed through the nerve. Now, the treatment which this patient has received is just that which I have mentioned. He has received the galvanic current passed from the neck down over the muscles, and in that way the current passes the entire length of the nerves affected with degeneration. But there is still another indication. You not only want to eliminate the lead and increase the regeneration of the nerve, but you should keep the muscles in good condition. When the nerve is degenerated the muscle to which it goes atrophies. If we do not do anything for these muscles they will go on atrophying, and then when the man's nerves have been regenerated and enable him to move the affected parts, he will find the muscles so weak that he will be disinclined to use them. Therefore the paralyzed muscles should be exercised by the aid of the interrupted galvanic current (not the constant galvanic current). You will see, therefore, that galvanism is used in this case in two different ways. First, the constant galvanic current is used to regenerate the nerve. Secondly, the interrupted galvanic current is applied to the affected muscles in order to give them exercise. Besides this we tell the patient to rub his muscles thoroughly with alcohol, salt water, or liniment of any kind. This patient has been usuing salt water. The benefit does not come so much from what we put on the limb as from the rubbing which the muscles receive. There is another little practical point in the treatment of cases of lead palsy which is of some interest. That is, that the atrophy of the muscles seems to progress more rapidly when the paralyzed muscles are put on the stretch. Now, when a man has lead poisoning, he is apt to go around with his wrists dropped, and you see at once that the paralyzed extensor muscles are those put on the stretch. You should, therefore, instruct such patients to carry their hands up against the chest in this way, so that the hand shall be kept in the position of extension.

CONFINEMENT PARALYLIS.

As there are two other cases which I wish to show you in addition to the one now present, I will hasten over the history. This little girl is eleven months old. The mother says that her right arm has been practically useless since she was born. I saw the child two weeks after its birth, when its condition was the same as to-day. She is unable to move the right arm as she does the left. The arm, you will observe, is held in a natural position, and when I take hold of it she attempts to pull it away. She moves it voluntarily. The right arm, on the contrary, hangs extended at the side, and apparently is not moved voluntarily at all. When I lift it and attempt to make her lift the arm, it drops heavily at her side when released. There is at least no voluntary movement at the shoulder. When I turn the hand up, supinate it, and then let it fall, we can see that it returns at once to the position of pronation. You can see that the child is unable to move the arm into the position of flexion at the elbow or into the position of supination. There is, therefore, not only paralysis at the shoulder, but also paralysis of flexion at the elbow and of supination. But when I hold the hand out you can see that the fingers move freely; when I place my finger into the palm of the child's hand it is clasped. There is, then, no trouble in either flexion or extension of the fingers and wrist. Now, I have made a careful electrical examination of the muscles (which I will not now repeat for want of time and because of the difficulty of such an examination in a child), and found the reaction of degeneration in the deltoid, biceps, coraco brachialis, brachialis anticus, and in the supinator longus muscles. I could not get at the supinator brevis because the arm was too fat. We have, then, paralysis of a peculiar group of muscles which I have just named. Now, this form of paralysis is known as Erb's paralysis, because Erb, of Heidelberg, was the first to describe it. It is, as you see, a paralysis of a group of muscles, while the other muscles of the arm escape.

To what may that be due? To one or two causes. It may be due to a lesion of the spinal cord at the level of the fifth cervical segment. As I have shown you by certain diagrams, that locality corresponds to the centres in the spinal cord which govern the group of muscles paralyzed in this case. The lesion at that point might, then, have caused this trouble; but there is also another lesion which sometimes produces it, namely, pressure exerted upon the fifth and sixth cervical nerve roots of the brachial plexus. How can we distinguish between the two? It can be done by the test of sensibility. If the lesion is in the anterior horns of the spinal cord; that is, if there is infantile paralysis, there will be no disturbance of sensation. If, however, the lesion is in the nerves containing sensory fibres there will be disturbance of sensation. Now, it is difficult to test the sensation of a child, and sometimes it can be done accurately only after repeated trials, but I think you can see in this case that when I scratch the right shoulder with a sharp instrument the child, although it looks around at what I am doing, pays but little attention, yet I have caused the skin to become quite red. When, on the contrary, I scratch the left shoulder, its attention is attracted at once, and on going a little further with the test the patient makes a face as if about to cry. I think we can fairly conclude from this test that the child has lost sensation on the outer side of the right arm. I have further proven this fact at former sittings by the use of electricity. The child will stand a very much stronger current without crying when it is applied to the outer side of the right arm than when it is applied to the left. There is disturbance of sensibility in the right arm. The trouble is not in the child's spinal cord, but it is in the fifth and sixth cervical nerves.

What is the cause of such paralysis? Usually the cause is a forcible delivery in the breach presentation. Now, this child presented by the breach and the labor went on until it was time for the head to be delivered. The midwife who was present extracted the child manually. How did she do it? In all probability just as you would have done, by introducing two fingers of the left hand and seizing the child on either side of the nose upon the superior maxillary bones. The next step is to extend the fingers of the right hand over the back of the child's neck and to make traction downward and backward. You will see as I put my fingers here on the side of the child's neck in this manner, as it would be done in the course of labor, I make pressure inward and downward above the clavicles, especially with the tips of my fingers; the pressure coming about the point of exit of the fifth and sixth cervical nerves. It is an interesting fact that in all the cases that I have seen of this disease (and I have seen quite a number) the paralysis has been on the right side; and you will notice that in this position the middle finger falls upon the right side of the patient's neck, and the index finger on the left side. That is, the longer finger is upon the right side, and is more likely to make downward pressure so as to involve these nerves. I think this may be the true explanation of the greater frequency of the accident on the right side of the body.

This form of paralysis was first described by Duchenne as confinement paralysis, and it has been recognized as such by all writers on paralysis of the nerves since that date. It is a paralysis due to pressure at the time of delivery upon the fifth and sixth cervical nerves. Those of you who have attended the surgical clinics will remember a similar condition in an adult at the Roosevelt Hospital. He had paralysis of the deltoid, of the biceps, of the coraco brachialis, of the brachialis anticus and supinator longus muscles. The other muscles of the arm were somewhat weak, but they were not paralyzed. The muscles I have just named exhibited the reaction of degeneration, and from that fact and the further history, the man having received a stab-wound, Drs. Sands and Hartley made a diagnosis of division of the fifth and sixth cervical nerves. That diagnosis was established by the operation. They cut down and found the divided nerves, united them, and the man recovered. That case is worthy of association in your minds with this one, which is a typical case of confinement or Erb's paralysis.

What is the prognosis in this case? It is somewhat doubtful. I recall three cases in which recovery was spontaneous. I have seen two others in which recovery took place under electrical treatment. The electrical treatment has been carried on somewhat irregularly in the case of this child, and we cannot say that there has been any change for the better. I should say, therefore, that it is a somewhat unfavorable case, yet there is one thing which is favorable about it. You will notice in comparing one shoulder with the other that there is not a great amount of difference as to size; in other words, the right deltoid is not atrophied to any extent. This is a favorable point in prognosis. If the nerve were absolutely degenerated and severed, the deltoid would be thoroughly atrophied. When the nerve is injured in only a moderate degree, atrophy is less extreme. I suppose the atrophy in a well-nourished child like this one would be somewhat concealed by the amount of fat. Nevertheless, I think the fact that these muscles which are paralyzed have not atrophied wholly, but have grown to some extent, would make the prognosis in this case good. It may be two years before the child will get the use of its arm, but I think that eventually she will get it. The electrical treatment in a case of this kind is the same as in the one of lead palsy, just described. Give the constant current through the nerve and the interrupted current over the muscle so as to produce contraction.

EPILEPTIC INSANITY.

I spoke to you, in my lecture on Thursday, of mental conditions arising in connection with epilepsy. You will have observed that the case, the history of which we have just obtained, illustrates two of those conditions very well. In the first place, it illustrates the condition of post-epileptic insanity. Post-epileptic insanity may take the form either of mania, or of melancholia, or of simple dementia, for they are all examples of psychical neuroses. In this man it evidently takes the form, to a certain extent, of melancholia. He is now thirty-two years old ; he says he has been sick at least twenty years. His mother, who has come with him, tells us that he has convulsions, which we at once recognize from her description as those of epilepsy, and that he has after each convulsion a short period of melancholia, is alarmed, is troubled, and makes exclamations at the times of his attacks in the form of prayer, and often cries, but is never violent. During the attacks and shortly afterwards he is perfectly unconscious, and later has no recollection of what had taken place. You will find other forms of psychical disturbance which are not so harmless, forms in which the individual after the fit passes into a state of acute mania, has hallucinations which terrify him, which make him fear that he is going to be injured, and which lead him to try to get away from those around him. If he is opposed in his attempts at escape, he will kill those in his way. The most violent of all lunatics are those who have temporary attacks of mania after epilepsy. They are perfectly ungovernable. That is a form of insanity in which restraint is absolutely neccessary ; you cannot get along without it. The state of mania, melancholia, or simple dementia, which occurs in these cases, lasts for a variable time. In this man it lasts ten minutes, in other cases fifteen or twenty minutes, and in still other cases four to five hours. During that time the individual is not at all legally responsible for what he does. He may go through an apparently well-planned attempt at murder, or a well-planned attempt at theft, or an attempt at any crime, and yet when he awakes from his sleep and comes out of this abnormal mental condition he has no recollection of anything he has done during that time. Now, that is a condition of post-epileptic insanity.

But there is another form of mental disturbance which develops in epilepsy. It is a gradual development of chronic dementia, which this man also shows. You can see from his appearance and judge from his mother's statements that this man's mind is not right. His memory is very poor. He cannot do anything in the way of work, evidently because no one will employ so weak-minded a person. This condition of weak-mindedness develops at a variable period in the course of epilepsy. If the epilepsy develops in early life, the child does not acquire knowledge readily, it grows up somewhat stupid; if the disease develops in the adult and continues for a long period, at the end of some twenty years you will find mental deterioration which goes on frequently to actual dementia.

I will not dwell upon the epileptic features of the case. You have heard the history; that the man has two kinds of attacks—grand-mal type, in which he has severe convulsions with biting of the tongue and convulsive movements all over the body; and the petit-mal type, in which he has simply temporary loss of consciousness, and does not go on to have a convulsion. These occur several times a week. The case is, therefore, a typical one of epilepsy. The aura which he has before the fit consists of dizziness, and is a very common aura, one which does not give us any indication as to the cause of the attack. The aura is a very important thing to investigate, for it is really an hallucination, and an hallucination is always produced by an irritation of the brain somewhere. If the aura is a constant one, we have an indication that irritation in the brain is localized at a definite point. If the aura consists in numbness beginning in the thumb and gradually going up the arm, and after the numbness has reached the body or head the patient goes into a fit, we know that there is an irritation in the brain which begins in the sensory area related to the arm. If the man has an aura of an epileptic fit consisting of a ball of fire, or of blue light, or of the appearance of certain figures moving around from one side of him until they reach the middle line, you may be sure that that man has an irritation in the posterior lobe in the visual area of the brain. If the man has an aura beginning as a very loud sound in the ear, you may be sure the irritation in the brain begins in the auditory area. So you see that the aura of an epileptic fit gives us information of the seat of the irritation, and it is an interesting fact that most of these auras occur in cases where organic disease of the cortex of the brain is to be suspected. But in a case like this one, in which the aura is only an indefinite sense of vertigo, which may occur in idiopathic epilepsy, the lesion is one which we do not know anything about. The treatment of such a case as this is similar to that of any case of epilepsy, and he is taking a mixture of the bromides of potassium, sodium, and ammonium, thirty grains three times a day. Under this line of treatment the number of attacks is being reduced. The treatment does not, however, appear to effect any change in the occurrence or duration of the melancholia period following the fit. When such a patient has maniacal attacks he requires constant watching.

PARANOIA.

I have still another case which illustrates an interesting mental condition, and one which those of you who have attended the lectures regularly will at once recognize as the history is called out. We have elicited from the man himself as distinct a history of his condition as we could desire. His age is about forty-five years. His sister, in reply to our questions, gives us no history of hereditary trouble. She says he has always been a somewhat simple-minded man. Simple in the Irish vocabulary means something a little different from what we naturally think of when that term is used, for in Ireland an imbecile is called a simple man, and it is probable that by the term simple she meant to say in as kind a word as possible that her brother has not been quite as strong mentally as other men. In his description of his case you will notice that he seems not to have the strength of character which most men have. It is possible that he has always been somewhat weak mentally, but his present mental trouble has come on recently, and is characterized by a delusion of persecution, a delusion which has increased rapidly in the course of three months, and which now, as you see, dominates his views of things, and which he has told us freely. He not only thinks certain men with whom he has worked have talked against him in his shop, but he thinks they have spread a malicious report around the city that he has seduced a young girl, and is the father of her child. He not only thinks that they have spread the report around the city, but that they have put it in the papers. He cannot find it in the English papers, he cannot read the German papers, but he thinks it is in the papers and therefore that it must be in the German papers, where he cannot detect it. It leads him not only to believe that everybody in the streets know of it, but that they single him out and look at him as he goes by. It is not probable, although he thinks it is so, that a lady walking along the street with her husband, would say anything about his "first-born," addressing him, a stranger, in that way. Therefore, it is not unlikely that he has hallucinations of sound. I could not get a history of hallucinations from his sister, but it is not impossible that he may have such. Hallucinations of sound are not at all uncommon in the course of paranoia. That is a form of degenerative insanity which is chronic and which is bad in its prognosis. The man is apparently harmless as yet, but his sister admits that he gets excited, that this delusion excites him at times, and on one occasion she had to lock him in. The only thing to do for a condition of mind of that kind is to put the man into a well-regulated asylum. There he will be prevented from doing any harm, which elsewhere he might take it into his head to do. As far as any active treatment for his condition goes, we know of nothing which will in any way alleviate it. We have to deal with the symptoms. You have heard his sister say that since he has been taking medicine the insomnia has subsided. Insomnia is a symptom of this form of insanity. We gave him bromides, but they failed, and we then gave him a mixture of bromides and chloral, which enabled him to sleep. He has also some slight amount of gastric catarrh. He has chronic dyspepsia, and he is in some degree constipated. When I examined him at a time previous to this he volunteered the information that the trouble in his stomach was due to something which his enemies had put into his food. You see, therefore, how his sensations are brought into relation with his dominant idea. He has symptoms of pain in the chest, of disturbance in the stomach, of insomnia, all of which he ascribes to the influence of outside enemies. His case illustrates what I told you in the course of lectures, that in the examination of a lunatic it is better to get at his history from a standpoint of a physician asking him medical questions, which will not direct his attention particularly to his delusion; it may be his desire to conceal that; but through his physical symptoms you can often get at his mental smyptoms. You saw that fact illustrated in this case. My first question was with regard to his health, and his first reply was with regard to the pain, and it was accompanied with the statement that "they" gave him the pain. That simple remark gave his whole story away. It is an interesting fact that in the examination of a lunatic you can often get at his delusion much better indirectly than directly. The characteristic feature of this case is the existence of a systematized delusion of persecution which dominates, but does impair his mental processes; and this is the characteristic of paranoia.